

Grade 12 University Chemistry – SCH4U

Mock Apple Pie Demonstration

Name: _____

Date: _____

Ministry Expectations

SCH3U

E. Solutions and Solubility

E3.2 explain the process of formation for solutions that are produced by dissolving ionic and molecular compounds (e.g., salt, oxygen) in water, and for solutions that are produced by dissolving non-polar solutes in non-polar solvents (e.g., grease in vegetable oil)

SCH4U

B. Organic Chemistry

B2.4 analyse, on the basis of inquiry, various organic chemical reactions (e.g., production of esters, polymerization, oxidation of alcohols, multiple bonds in an organic compound, combustion reactions, addition reactions)

E. Chemical Systems and Equilibrium

E3.6 explain the Brønsted-Lowry theory of acids and bases

Introduction and Background

The following demonstration can be used to introduce Organic Chemistry.

Materials

1 cup water
1 cup sugar
1 tsp cream of tartar
0.5 tsp cinnamon
6-8 crackers
pie crust
lemon juice (optional)
butter (optional)
hot plate
stir rod
500mL beaker

Procedure

- 1) Dissolve the sugar and cream of tartar in boiling water until thick.
- 2) Add the crackers and stir gently.
- 3) Add the cinnamon and serve in precooked mini pie crusts.

Results

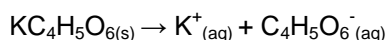
Mixture will take on the consistency, smell, and taste of apple pie.

Safety

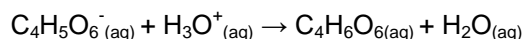
All materials are edible and can be disposed in the garbage

Explanation

Potassium hydrogen tartrate is a carboxylic acid salt. It ionizes when dissolved in water.



Hydrogen tartrate is a proton acceptor while water is a proton donor. The transfer of a proton creates tartaric acid which is sour in taste.



Tips for Success/Teacher Notes

Please note that cinnamon is a homogeneous mixture of molecules. Cinnamaldehyde is the molecule that gives cinnamon its unique flavour and odour. The same can be said for lemon juice and citric acid.

References

Kraft Foods Global. (2012). *Ritz Mock Apple Pie*. Retrieved January 25, 2012, from <http://www.kraftrecipes.com/recipes/ritz-mock-apple-pie-53709.aspx>

All Recipes. (2012). *Appleless Apple Pie*. Retrieved January 25, 2012, from <http://allrecipes.com/recipe/appleless-apple-pie/>

Grade 12 University Chemistry – SCH4U

Mock Apple Pie Recipe

Name: _____

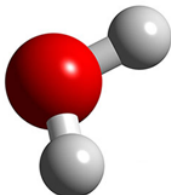
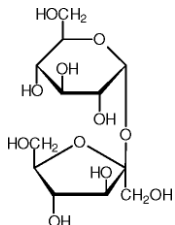
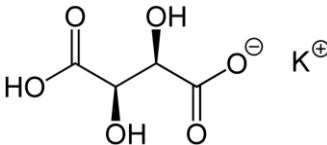
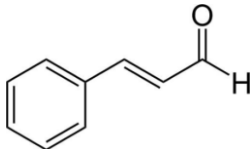
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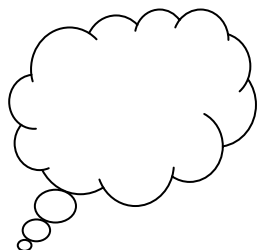
**Please try the following experiment at home
Eating and drinking in the lab is strictly forbidden**

What are the tastes and textures of apple pie?

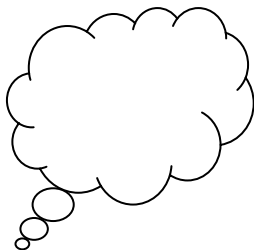
Ingredients

<p>H_2O Water</p>  <p>13.9mols = _____</p>	<p>$\text{C}_{12}\text{H}_{22}\text{O}_{11}$ Sucrose</p>  <p>1.15mols = _____</p>
<p>$\text{KC}_4\text{H}_5\text{O}_6$ Potassium Hydrogen Tartrate</p>  <p>0.0527mols = _____</p>	<p>$\text{C}_9\text{H}_8\text{O}$ Cinnamaldehyde</p>  <p>0.0199mols = _____</p>
<p>Crackers Mini Pie Crust Citric Acid (optional) Homogeneous Mixture of Triglycerides (optional)</p>	<p>$\text{MM}_{\text{H}_2\text{O}}=18\text{g/mol}$, $D=1\text{g/mL}$ $\text{MM}_{\text{C}_{12}\text{H}_{22}\text{O}_{11}}=342\text{g/mol}$, $D=1.58\text{g/mL}$ $\text{MM}_{\text{KC}_4\text{H}_5\text{O}_6}=188\text{g/mol}$, $D=1.98\text{g/mL}$ $\text{MM}_{\text{C}_9\text{H}_8\text{O}}=132\text{g/mol}$, $D=1.05\text{g/mL}$ $1\text{ cup}=250\text{mL}$, $1\text{ tbsp}=15\text{mL}$, $1\text{ tsp}=5\text{mL}$</p>

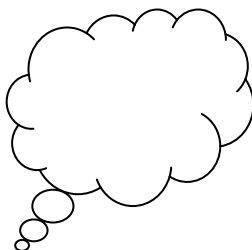
Use **GRASP** to convert the ingredient quantities into “everyday” measurements:



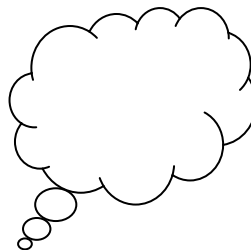
Given



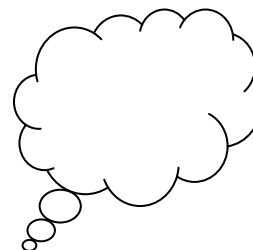
Required



Analyze



Solve



Paraphrase